

AB152. 65. *In vitro* investigation of the expression and contribution of glycolysis enzymes to breast cancer

Eimear O'Leary, Joanne Nolan, Amira Mahdi, Patrick Kiely

Graduate Entry Medical School, University of Limerick, Castletroy, Limerick, Ireland

Background: Increased glucose metabolism under aerobic conditions is a well-known hallmark of cancer, first described by Otto Warburg in the 1920s. This characteristic upregulation of glucose metabolism is necessary to provide energy for replication and forms the basis of much study in cancer research.

Methods: We set out to better understand this role in breast cancer by examining the expression of genes involved in glucose metabolism in two breast cancer cell lines. Both cell lines are invasive breast carcinomas with differing receptor expression: MCF-7 (oestrogen and progesterone positive) and MDA-MB-231 (triple negative). We examined the expression of nine genes that code for these enzymes by quantitative real time polymerase chain reaction (qRT-PCR) when these cells were cultured in the presence of differing glucose concentrations, growth factors and on different extracellular matrices.

Results: We found a dysregulation in glycolytic enzyme gene expression using heat map analysis. Each cell line responded differently to their culturing conditions with the greatest dysregulation being evident for the MCF-7 cell line exposed to collagen-1, laminin and fibronectin and for the MDA-MB-231 cell line when cultured on collagen-1 and fibronectin. When cells were grown with low glucose media (5 mM) there was an upregulation in the expression of our genes when compared to the normal culturing media (25 mM). Upregulation was also observed when cells were stimulated with insulin-like growth factor 1 (IGF-1) and epidermal growth factor (EGF).

Conclusions: This preliminary research showed that when two different breast cancer cell lines were exposed to different culturing conditions each had a unique response in terms of glycolytic enzyme gene expression. The greatest dysregulation to gene expression was seen when proteins of the extracellular matrix were changed. Overall these findings show that these cell lines with different receptor expression each have individual responses despite being the same pathological lesion. Further research in this area could yield interesting information for future developments of breast cancer research in areas such as breast cancer diagnostics, therapeutics and prognostics.

Keywords: Breast cancer; extracellular matrix; glycolysis

doi: 10.21037/map.2019.AB152

Cite this abstract as: O'Leary E, Nolan J, Mahdi A, Kiely P. *In vitro* investigation of the expression and contribution of glycolysis enzymes to breast cancer. Mesentery Peritoneum 2019;3:AB152.